UNITED STATES SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, Len Diveglio, a citizen of the United States, residing at 79 Seymour Lane, Medford, NY 11763 have invented certain new and useful improvements in a

Batting Trainer

of which the following is a specification.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a batting trainer that can be used to train a batter to hit a ball using a plurality of lights.

2. The Prior Art

Batting trainers are known in the art. For example, the following U.S. patents disclose sports training devices wherein at least one of these references is a batting trainer: U.S. Patent Nos: 4,142,171; 1,170,467; 5,605,326, 4,461,477; 4,461,475; 5,711,726; 5,833,549 all incorporated herein by reference.

SUMMARY OF THE INVENTION

The invention relates to a device for training batters comprising a stand, a housing coupled to the stand and a plurality of lights disposed in the housing.

There is also at least one processor in electrical communication with the lights for controlling the turning on and off of each of the lights to indicate that a pitch has been thrown. This device can also include a power supply in communication with the processor and the lights. The power supply can be a battery or any other Direct Current (DC) apparatus or an Alternating Current (AC) type device such as a plug into an outlet. The power supply can be used along with the processor to turn the lights on and off. To assist the power supply and the processor there is a switch which is in communication with the processor and the lights. This switch is for turning on and off at least one of the lights.

There can be at least one area sensor disposed in the housing and in communication with the processor. This type of area sensor can be in the form of an area sensor shown in U.S. Patent no. 6,196,932 to *Marsh et al* incorporated herein by reference. Other sensor systems are also known such as from U.S. Patent Nos. 4,659,090 to *Kustanovich;* 5,757,266 to *Rider et al;* 5,209,483 to *Gedney et al* all incorporated herein by reference. This sensor is for detecting whether the housing has been struck by a bat. There can also be an array of multiple sensors wherein each sensor is associated

with or is disposed adjacent to each of the lights. Thus, when a light lights up, and the user strikes the light with the sensor, then there is an indication sent from the sensor to the processor to indicate that the light has been struck.

This housing has a front surface facing a user and the sensor or sensor array is for detecting whether the front surface of the housing is hit by the user.

The sensors are positioned in this housing so that they contact a front face of the housing particularly in the area of the lights. Thus, the sensors sense when either one of the lights is struck by a user or whether the housing is struck in a region of the light.

The user can strike the front face of the housing which faces the user when the device is in use, and wherein the lights are positioned in an exposed manner in the housing so that when the light is turned on, light from these lights extends out of the front face so that the user has an indication of a pitch being thrown. In one embodiment, the lights are recessed in the housing with each sensor being positioned on the front face and around each of the lights.

In another embodiment, coverings for the lights extend outside of the housing and are made from a resilient material such as a flexible plastic.

This device can also comprise at least one indicator or indicia marking, indicating different sections of the front face of the housing, wherein at least one of the indicators can indicate a strike zone for the user.

There is also a connecting arm coupling the housing to the stand. So that this device can receive a strong impact from a bat, this device can also include hinge coupling the connecting arm to the stand. Inside or coupled to the hinge can be a spring for biasing the housing in an upright position. This spring is of sufficient strength to keep the housing in this upright manner when it is not struck by the user's bat.

In addition, to keep this housing in this upright position, the stand is counter-weighted against the housing so that when the housing is struck, it does not fall end over end. Alternatively, this stand could be secured to a floor so that when the housing is struck, it does not fall over.

This device can also optionally include a sensor in communication with the processor for determining a force of impact on the housing by the user striking the housing with a bat. This sensor can be coupled to the hinge wherein the sensor determines the force applied to the housing by determining a movement in the hinge in response to the housing being hit by the user. The device calculates this applied force by correlating the rotational distance traveled by the housing on the hinge, vs. the counteracting force of the spring on the hinge. This information is sent from the sensor to the processor to create this determination.

This device can also include a scoreboard coupled to the housing, wherein the scoreboard is in communication with the processor. This scoreboard can give the pitch count as well as the batting average or actually keep track of an actual baseball game being played between the user and this system.

This device can also include a memory unit, which is in communication with the processor, this memory unit is for storing a set of instructions to the processor and it can also store previous readings from the sensors including a

batting average and the force created by each bat striking the front surface of the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings. It should be understood, however, that the drawings are designed for the purpose of illustration only and not as a definition of the limits of the invention.

In the drawings, wherein similar reference characters denote similar elements throughout the several views:

FIG. 1 shows a side perspective view of a first embodiment of the invention;

FIG. 2 shows a schematic block diagram of a set of electronic components associated with the invention;

FIG. 3A shows a grid for the control of lights which includes switches;

FIG. 3B shows an electronic grid for the reading of sensors;

FIG. 4 shows a front view of the housing associated with the invention;

FIG. 5 shows a top view of a user using one embodiment of the device; and

FIG. 6 is a side view of the user using the device as shown in FIG. 5.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings, FIG. 1 shows a perspective view of a device 10 for training batters which includes a housing or box 20, a plurality of lights 22 which are used as indicators disposed in the housing, a stand or base 50 and a support arm 30 which can extend vertically, coupling the stand to the housing. Support arm 30 can be in the form of a telescoping support arm. This support arm can be optionally coupled to the stand via a hinge or rotator 40. This hinge

is a rotating hinge that includes a spring force mechanism 45 which can also include a piezoelectric sensor which biases support arm 30 having a telescoping member 35 and housing 20 in an upright position and detects the force placed on housing 20 when it is struck.

Essentially, housing 20 can be made from one or more different resilient components including plastic, rubber, metal or any other known resilient material. For example, housing 20 could be made from a metal such as steel and then coated with rubber to reduce the shock to a person's system when hitting housing 20.

With this design, lights 22 are disposed in housing 20 with the outside cover of the light either recessed inside of the housing, or extending out of housing 20. Lights 22 can be made from a resilient material as well, including a resilient plastic and can be in any form such as an LED light which is in a preferred form, a bulb or any other type light known in the art. This type of resilient plastic could also be flexible so that it absorbs the shock of being hit by a baseball bat. In addition, this design can have optional wheels 47 coupled to one end of stand 50 on either side of

this stand 50 with the opposite side not shown wherein these wheels are shown by dashed lines. Wheels 47 allow the device to be portable so that it can be wheeled from one area to another. To ease in the wheeling of this device there is also a handle 51 coupled to housing 20. In addition there is also a coupling mechanism 53 which allows stand 50 to be secured to the ground. Coupling mechanism 53 can be in the form of a hook or a lock which locks to an adjacent hook or lock on the ground to keep stand 50 from flipping up when housing 20 is struck with a bat. Since the wheels, the handle and the coupling mechanism are optional features, other embodiments need not include these components.

FIG. 2 shows a schematic block diagram of a set of electronic components 60 for device 10 wherein this set of electronic components, can in a first embodiment, be housed in housing 20. In another embodiment, lights 22 are disposed inside of housing 20, while area sensor 68 is disposed in housing 20, but central processor 62, switches 63, power sensor 65 and power unit 66, and memory 67 are disposed in stand 50. In addition, as shown in FIG. 4, a scoreboard 64 is optionally connected to a top section of housing 20 to display a pitch count or a hitting tally of the user.

Essentially, electronic components operate as follows: central processor or computing element 62 receives a set of instructions from memory 67 which can be in the form of RAM (Random Access Memory) or flash memory for controlling lights 22, area sensor 68, power sensor 65, power unit 66, switches 63 and scoreboard 64. The instructions in memory 67 are in the form of a program wherein this program through processor 62 controls which of lights 22 are illuminated and the duration of that illumination.

Power sensor 65 is in the form of a piezoelectric sensor which can be inserted into a spring force mechanism for reading the spring forces from a batter hitting housing or box 20. As housing 20 is hit it rotates against stand 50 so that support arm rotates for example in a substantially clockwise manner so that it rotates and the distance traveled by housing 20 and the force placed on spring force mechanism 45 in this rotating manner registers a signal which is sent either through a wire or wirelessly to processor 62.

One of the instructions fed into processor 62 is to control the switching on and off of a selected light 22 shown in FIG. 3A. In this case, as shown in FIG 3A lights 22 are

disposed in a matrix 31 wherein each light is identified by its location in matrix 31 having lines 33 which intersect at points to provide a point for switch 63.

Thus, each light 22 in housing 20 can have a switch 63 associated with it so that processor 62 can selectively turn on or off light 22. This switch may be located adjacent to the light and in electrical communication with electrical wires feeding into light 22 to control the switching on and off of the light. Each switch has a singular identity which is stored in memory 67 to identify each light location. Thus, processor can then send a signal to each switch to turn on or off a particular light. In this case, processor 62 can have a series of instructions to randomly select one of lights 22 in either a random order or in a select order. Processor 62 can also control the duration of the illumination of that particular light. For example, to simulate a slower pitch, the light would stay illuminated for a longer period of time. However, to simulate a faster pitch, the light would stay illuminated for a shorter period of time.

FIG. 3B shows the matrix with area sensors 68 disposed therein. These area sensors also each have an identity to them wherein the identity of these sensors is stored in memory 67 as well. Thus, when any one of sensors 68 is struck, it sends a signal back to processor 62 which along with memory 67 identifies the location of the bat strike so that it can register whether a user has struck the region associated with the light, or whether the user has missed the region associated with a particular light. In this case, processor 62 also tracks whether the region associated with a particular light 22 is struck at a particular time so as to indicate that the user struck a ball.

FIG. 4 shows housing 20 which has the various regions for lights 22 disposed in housing 20. For example, FIG. 4 shows that housing 20 includes a strike zone 24 and also many different regions or sections disposed around a periphery of the strike zone. For example, strike zone 24 is formed as a 3x4 box matrix of lights in a center region of housing 20. First peripheral region or corner region 23 is disposed in a top left corner and is formed as a 3x2 matrix box of lights which overlaps strike zone 24. Second peripheral or corner region 25 is disposed in a top right corner and is formed as

a 3x2 matrix box of lights overlapping strike zone 24. Third peripheral or corner region 27 is disposed in a bottom left corner and is formed as a 3x2 matrix box of lights overlapping strike zone 24. Finally, fourth peripheral or corner region 29 is disposed in a lower right corner and is formed as a 3x2 matrix box of lights overlapping strike zone 24.

With these sections, a user can instruct processor 62 to control or favor the area selected so that all of the lights or a greater number of the lights that light up will be in one of the selected areas. This feature allows a hitter who is practicing his ability to hit a ball in a particular region, to weight the occurrence of pitches in that particular region. This device can also include a selector such as an adjustment knob 80 to weight the occurrence of pitches in these regions. The adjustment knob can be set so that a greater percentage of lights light up in a particular region vs. another set of lights.

In this embodiment, disposed on top of housing 20 is an additional light or indicator 90 which lights up to indicate the start of a pitcher's pitch. This additional light is in

electrical communication with switches 63, and also in communication with processor 62 so that processor 62 controls when additional light lights up and the time period between when additional light or indicator 90 is turned on and when the selected one of lights 22 turns on to indicate a pitch crossing a plate.

The process occurs as follows: the user sets the appropriate settings for his or her skill level using selectors or adjustment knobs 80 and 82. The first selector 80 is for setting the areas for the pitches to be located. The user can select to have all, or a certain percentage of the pitches or lights associated with the pitches to occur within strike zone 24, or in one of the peripheral regions 23, 25, 27 or 29. In this way, the user can work on hitting a ball in a particular area that a pitcher may pitch. For example, if the user was a right handed batter and typically struggled with hitting balls that were "high and tight" which is baseball terminology for pitches in peripheral zone 23, then that user could select to have a disproportionate number of lights lighting up in region 23 to indicate that a pitch was thrown in that region. If that same batter struggled with hitting pitches that were "low and away" and wanted to

work on hitting balls in that region, the user could select to have processor 62 to favor pitches in peripheral region 29.

The user could also select the speed at which the pitches would occur using selector 82. This selector would be used to determine the time period for lighting up the light selected by processor 62 and also for the time period between the illumination of additional light 90, which indicates when a pitcher is throwing a pitch, and the time period when the selected one of lights 22 is lit.

Thus, if a user struggled with hitting extremely fast fast-balls, the user could select to have device 10 to imitate the timing for a 95 mph fastball over a plate. Thus, the timing between when additional light 90 is lit and the selected one of lights 22 is lit would be dramatically shortened and also the time period for the duration of the selected one of lights 22 being lit would be dramatically shortened when compared to a pitch that was representative of an 85 mph fastball. Thus, the user has some flexibility in selecting the timing and also the placement of pitches with respect to front face 21 of housing 20.

As the user swings his or her bat, the user attempts to strike front face 21 of housing 20 in a region where the selected one of lights 22 is lit. The selected one of lights 22 is lit to indicate the time period that the ball is in flight and also the region of flight of the ball. If for any reason the user hits a light or even the selected light before it is lit, then it is not recorded as a hit in processor 62 and is not shown in scoreboard 64. If the user strikes the light when it is lit, then this is termed a hit in processor 62 and scoreboard 64.

In another embodiment of the invention, there is a distance indicator or light series 92 disposed on top of housing 20, wherein distance indicator 92 includes a plurality of lights including an initial light 94 indicating the time period when the pitch leaves the pitchers hand and another adjacent light 96 indicating when the pitch starts to cross a user's plate. For example, when the pitch is released a light on the left hand side of the plurality of lights or initial light 94 first lights up and then an adjacent light lights up, followed by the next one all the way to the right most light. The light 96 just one place to the left of the right most light is lit indicating the time

period that the ball would start to cross the plate. This indicator 92 is thus used to help the user perfect his or her timing on hitting a baseball.

If the ball has been struck, wherein the user strikes a sensor in a vicinity of a lit light during the time period allowed for hitting the ball, then this information is sent to processor 62 which then sends instructions on to scoreboard 64 to indicate a hit. If the user hits a region other than the region indicating where a ball has been thrown then that sensor that has been struck sends a signal to processor 62 which then forwards this information onto scoreboard 64 in the form of a strike. In addition, of a pitch has been indicated inside of the strike zone 24 and the user does not swing or the user does not hit the sensor in time, then this pitch is indicated as a strike on scoreboard 64. If the pitch is located outside of the strike zone 24 and the user does not swing then this pitch is indicated as a ball on scoreboard 64. Just as in baseball, if in a single turn at bat the user receives four balls before he receives three strikes then this is recorded as a walk on scoreboard 64 and the pitch count starts over again with a new batter. In addition if the user either gets a hit or strikes out,

then the scoreboard indicates this feature on the board and the pitch count starts over again.

FIG. 5 discloses a top view of the device substantially shown in FIG. 1 which shows a home plate 100 which is disposed adjacent to stand 50 which can be embedded into an adjacent floor for additional stability. In addition, housing 20 is shown rotated vs. the position of the batter so that the bat can strike housing 20 with the bat positioned at an angle so as to not hit housing 20 with only a small portion of the bat.

FIG. 6 shows a side view of the device 10 wherein housing 20 is rotated as shown in FIG. 5 as well. With this view, the batter is starting his swing to hit a particular light 22 and then have this information be registered in scoreboard 64. Essentially, housing 20 is rotatably coupled to support arm 30 on a hinge 32 so that housing 20 can rotate either before being hit, or once hit by a bat. In that way, the bat hits flush against housing 20. Thus, with this design, the user can develop his or her reaction time and coordination to a pitch.

Accordingly, while at least one embodiment of the present invention have been shown and described, it is to be understood that many changes and modifications may be made thereunto without departing from the spirit and scope of the invention as defined in the appended claims.